

IN THE CLAIMS

1. (Original) A method for detecting shadow regions in an image, the steps comprising:

- a) providing an original image;
- b) modeling said image as a reliable lattice (RL);
- c) determining a relationship between said RL model and an Markov (MRF) model;
- d) applying region level verification to said MRF model; and
- e) identifying shadow regions in said original image from said MRF model.

2. (Original) The method for detecting shadow regions in an image as recited in claim 1, wherein said original image is a single, static image.

3. (Original) The method for detecting shadow regions in an image as recited in claim 2, wherein said single, static image is illuminated by substantially a single point illumination source.

4. (Original) The method for detecting shadow regions in an image as recited in claim 2, wherein said single point illumination source is the sun.

5. (Original) The method for detecting shadow regions in an image as recited in claim 2, wherein said single, static image comprises an aerial image.

6. (Original) The method for detecting shadow regions in an image as recited in claim 1, wherein said modeling said image as an RL step (b) comprises the sub-step of modeling an initial RL.

7. (Original) The method for detecting shadow regions in an image as recited in claim 6, wherein said modeling said image as an RL step (b) further comprises the sub-step of updating said initial RL.

8. (Original) The method for detecting shadow regions in an image as recited in claim 7, wherein said sub-step of updating said initial RL comprises iteratively updating said initial RL.

9. (Original) The method for detecting shadow regions in an image as recited in claim 8, wherein said sub-step of iteratively updating said initial RL continues until at least one of the conditions have been met: a predetermined number of iterations are performed, and until a predetermined condition is met.

10. (Original) The method for detecting shadow regions in an image as recited in claim 1, wherein said modeling said image as an RL step (b) comprises the sub-step of determining the reliability of said RL.

11. (Original) The method for detecting shadow regions in an image as recited in claim 10, wherein said sub-step of determining the reliability of said RL comprises determining a maximum reliability of said RL.

12. (Original) The method for detecting shadow regions in an image as recited in claim 10, wherein said sub-step of determining a maximum reliability of said RL comprises using an expectation maximization (EM) algorithm.

13. (Original) The method for detecting shadow regions in an image as recited in claim 1, the steps further comprising:

f) removing at least one false shadow region from a list of detected shadow regions.

14. (Original) The method for detecting shadow regions in an image as recited in claim 1, the steps further comprising:

f) preprocessing said original image from an a red/green/blue RGB) color space into a normalized LogRGB space.

15. (Original) The method for detecting shadow regions in an image as recited in claim 1, the steps further comprising:

f) performing region level verification.

16. (Original) The method for detecting shadow regions in an image as recited in claim 15, wherein said performing region level verification step (f) comprises further exploiting domain knowledge.

17. (New) The method for detecting shadow regions in an image as recited in claim 1, wherein the reliable lattice comprises a mapping of the original image to a lattice, having node reliabilities and link reliabilities, wherein a node reliability expresses a probability of a correct pixel shadow detection, and link reliability expresses a probability that two pixels may become neighbors.

18. (New) The method for detecting shadow regions in an image as recited in claim 1, wherein the region level verification is sensitive to an object geometry.

19. (New) A method for detecting probable shadow regions in an image, comprising:

a) modeling the image as a reliable lattice having node reliabilities and link reliabilities;

b) determining a relationship between the reliable lattice model and an Markov Random Field model to detect putative shadow regions;

c) applying region level verification to the Markov Random Field model to remove false positive detected shadow regions; and

d) storing identifications of non-false positive shadow regions.

20. (New) A method for detecting probable shadow regions within a two dimensional pixel image, comprising:

- a) modeling the image as a reliable lattice having node reliabilities and link reliabilities with respect to pixel shadow status classification;
- b) determining a relationship between the reliable lattice model of the image and an Markov Random Field model to detect likely shadow regions of the image;
- c) applying region level verification to the detected likely shadow regions in the image to detect false positive shadow regions in the image; and
- d) storing identifications of detected shadow regions in the image.